

WHAT IS CLAIMED IS:

5            1.    A method for improving the reliability of an engine comprising:

             providing a single engine having an output shaft and first and second power producing members producing power driving the output shaft;

10           providing a first set of systems serving the first power producing member;

             providing a second set of systems separated from the first set of systems and comprising the same type of systems as the first set of systems, the second set of systems  
15           serving the second power producing member;

             operating the engine, whereby said power producing members drive said shaft;

             detecting performance degradation of a system of said first and second set of systems or performance  
20           degradation of one of the first and second power producing members;

             reducing a function of at least one system of said first and second sets of systems having the performance degraded system or serving the performance degraded power  
25           producing member; and

             continuing the operation of the engine with said power producing member served by the performance degraded system or said performance degraded power producing member producing a reduced power level relative to the other power  
30           producing member.

             2.    A method as recited in claim 1 wherein reducing a function comprises shutting down the power produced by the performance degraded power producing member or served by the  
35           performance degraded system.

3.    A method as recited in claim 2 wherein shutting down  
----- the power comprises shutting down a fuel system of said first  
5    and second set of systems having the performance degraded  
system.

4.    A method as recited in claim 1 wherein the engine is  
selected from the group of engines consisting of Otto cycle,  
10    diesel and rotary engines and wherein the power producing  
members are selected from the group of power producing members  
consisting of pistons and rotors.

5.    A method as recited in claim 1 wherein the first and  
15    second set of systems each comprise systems selected from the  
group of systems consisting of fuel systems, air handling  
systems, sensor systems, cooling systems and control systems.

6.    A method for operating a single engine comprising an  
20    output shaft, a first power producing member and a second  
power producing member, wherein the first and second power  
producing members produce power to drive said output shaft,  
the method comprising:

25    controlling the operation of a first fuel system  
providing fuel to operate the first power producing member;

controlling the operation of a first set of systems  
serving the first power producing member;

30    controlling the operation of a second fuel system  
providing fuel to operate the second power producing member;

controlling the operation of a second set of systems  
separate from the first set of systems and comprising systems  
of the same type as the first set of systems, the second set  
of systems serving the second power producing member;

35    detecting performance degradation of one system of said

first and second set of systems or one of said power producing members; and

5        reducing a function of at least one of the systems of said first and second set of systems for reducing the production of power by the power producing member served by the performance degraded system or by the performance degraded power producing member while maintaining the production of  
10       power by said other of said first and second power producing members and the continued operation of the engine.

7.     A method as recited in claim 6 wherein reducing a function comprises shutting down the power produced by the  
15       performance degraded power producing member or served by the performance degraded system.

8.     A method as recited in claim 7 wherein shutting down the power comprises shutting down one of the first and second  
20       fuel systems serving the performance degraded power producing member or serving the power producing member served by the performance degraded system.

9.     A method as recited in claim 6 wherein detecting performance degradation comprises detecting failure of one  
25       system of said first and second sets of systems.

10.    A method as recited in claim 6 further comprising identifying the power producing member that is performance  
30       degraded or that is served by the detected performance degraded system.

11.    A method as recited in claim 6 wherein the first fuel system and first set of systems are only coupled to and  
35       serve the first power producing member and wherein the second

fuel system and the second set of systems are only coupled to  
and serve the second power producing member.

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12. A method as recited in claim 6 wherein the engine is  
selected from the group of engines consisting of Otto cycle,  
diesel and rotary engines and wherein the power producing  
members are selected from the group of power producing members  
10 consisting of pistons and rotors.

13. A method as recited in claim 6 wherein the first and  
second set of systems each comprise systems selected from the  
group of systems consisting of fuel systems, air handling  
15 systems, sensor systems, cooling systems and control systems.

14. A method for operating a single engine comprising an  
output shaft, a first power producing member and a second  
power producing member, wherein the first and second power  
20 producing members produce power to drive said output shaft,  
the method comprising:

controlling the operation of a first set of systems  
serving the first power producing member;

25 controlling the operation of a second set of systems  
separate from the first set of systems and comprising the same  
type of systems as the first set of systems, the second set of  
systems serving the second producing member;

30 detecting performance degradation of one system of said  
first and second set systems or of one of said first and  
second power producing members; and

35 reducing a function of at least one of the systems of  
said first and second set of systems serving the power  
producing member served by the performance degraded system or  
serving the performance degraded power producing member for

reducing the production of power by said power producing member while maintaining the production of power by said other  
5 of said first and second power producing members and the continued operation of the engine.

15. A method as recited in claim 14 wherein reducing a function comprises shutting down the power produced by the  
10 performance degraded power producing member or served by the degraded system.

16. A method as recited in claim 15 wherein shutting down the power comprises shutting down a fuel system of said  
15 first and second set of systems having the performance degraded system.

17. A method as recited in claim 14 further comprising identifying the performance degraded power producing member or  
20 the power producing member served by the detected performance degraded system.

18. A method as recited in claim 14 wherein the first set of systems are only coupled to and serve only the first  
25 power producing member and wherein the second set of systems are only coupled to and serve the second power producing member.

19. A method as recited in claim 14 wherein the engine  
30 is selected from the group of engines consisting of Otto cycle, diesel and rotary engines and wherein the power producing members are selected from the group of power producing members consisting of pistons and rotors.

20. A method as recited in claim 14 wherein the first  
and second set of systems each comprise systems selected from  
5 the group of systems consisting of fuel systems, air handling  
systems, sensor systems, cooling systems and control systems.

21. An engine system comprising:  
a single engine having an output shaft, first power  
10 producing member and a second power producing member, wherein  
both power producing members produce power to drive the output  
shaft;

a first set of systems serving the first power producing  
member;

15 a second set of systems serving the second power  
producing member, wherein the second set of systems is  
separate from the first set of systems and comprise systems of  
the same type as the first set of systems;

a first fuel system providing fuel to the first power  
20 producing member and not the second power producing member;  
and

a second fuel system providing fuel to the second power  
producing member and not to the first power producing member,  
wherein the engine is operational when one of said fuel  
25 systems shuts down and no fuel is provided to one of said  
first and second power producing members.

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